

CLAIMS

1. A high frequency dielectric ceramics composition constituted by combining a combination of $(\text{Zn}_{1-x}\text{M}_x)\text{TiO}_3$ and $y\text{TiO}_2$ as a main component, into
 5 which one of 0~5 wt % B_2O_3 , 0~5 wt % H_3BO_3 , 0~5 wt % $\text{SiO}_2\text{-K}_2\text{O}$ glass, 0~5 wt % B_2O_3 and $\text{SiO}_2\text{-K}_2\text{O}$ glass, or 0~5 wt % H_3BO_3 and $\text{SiO}_2\text{-K}_2\text{O}$ glass is added as an additive, satisfies conditions of

M is Mg, Co or Ni,

'x' is $0 \leq x \leq 0.55$ in case of Mg and 'x' is $0 \leq x \leq 1.0$ in case of Co, and

10 $0 \leq x \leq 1.0$ in case of Ni, and

$0 \leq y \leq 0.6$.

2. A high frequency dielectric ceramics composition preparation method in which material powder of ZnO, MO (in this respect, MO is MgO, CoO
 15 or NiO) and TiO_2 is weighed according to a composition range of $(\text{Zn}_{1-x}\text{M}_x)\text{TiO}_3$ and $y\text{TiO}_2$ (M is one of Mg, Co and Ni, x is $0 \leq x \leq 0.55$ in case of Mg, x is $0 \leq x \leq 1$ in case of Co, x is $0 \leq x \leq 1$ in case of Ni, and y is $0 \leq y \leq 0.6$), mixed and dried,

the dried powder is calcined at a temperature of 850~950°C,

the calcined powder is mixed with one of 0~5 wt % B_2O_3 , 0~5 wt %
 20 H_3BO_3 , 0~5 wt % $\text{SiO}_2\text{-K}_2\text{O}$ glass, 0~5 wt % B_2O_3 and $\text{SiO}_2\text{-K}_2\text{O}$ glass, or 0~5 wt % H_3BO_3 and $\text{SiO}_2\text{-K}_2\text{O}$ glass as an additive,

the mixed powder is crushed,

the crushed power is shaped,

the shaped body is fired at a temperature of 800~925°C, and

(Zn_{1-x}M_x)TiO₃ is calcined at a temperature corresponding to a region (region II) of below a phase dissociation temperature as shown in Figure 1 to obtain (Zn_{1-x}M_x)TiO₃ (M is Mg, Co or Ni) of a single phase of rhombohedral/hexagonal crystal.

3. The method of claim 2, wherein the shaped body is made in a manner that an aqueous solution adding a PVA binder is sprayed onto the crushed powder to make a granule, to which a pressure is applied.

4. The method of claim 3, further comprises a step for maintaining the shaped body at a temperature of 300~500°C for a predetermined time and removing the binder.

5. The method of claim 2, wherein (Zn_{1-x}M_x)TiO₃ is first calcined, and the calcined (Zn_{1-x}M_x)TiO₃ is mixed with one of 0~5 wt % B₂O₃, 0~5 wt % H₃BO₃, 0~5 wt % SiO₂-K₂O glass, 0~5 wt % B₂O₃ and SiO₂-K₂O glass, or 0~5 wt % H₃BO₃ and SiO₂-K₂O glass as an additive, and then fired.

6. A high frequency dielectric ceramics composition constituted by combining a combination (Zn_{1-a}Mg_{1-b}Co_{1-c}Ni_{1-d})TiO₃ and yTiO₂ as a main component, into which one of 0~5 wt % B₂O₃, 0~5 wt % H₃BO₃, 0~5 wt % SiO₂-K₂O glass, 0~5 wt % B₂O₃ and SiO₂-K₂O glass, or 0~5 wt % H₃BO₃ and SiO₂-

K₂O glass is added as an additive, satisfies conditions of

$0 \leq a \leq 1$, $0 \leq b \leq 1$, $0 \leq c \leq 1$, $0 \leq d \leq 1$ and

$0 \leq y \leq 0.6$.

5 7. Various high frequency devices such as a multilayer chip
capacitor, a multilayer chip filter, a multilayer chip capacitor/inductor composite
device and a module, a low-temperature sintered substrate, a resonator and
a filter or a ceramic antenna, are fabricated by using the dielectric composition
of claim 1.

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